

I claim:

1. A coupling for attachment to the end portion of a pipe, comprising:

a coupling body to closely receive the end portion of the pipe to be coupled therewith, said coupling body including an inner end taper;

a set of jaw members slidably positioned in the inner end taper of the coupling body so that linear movement of the jaw members toward the end of the inner end taper adjacent an end of the coupling body causes movement of the jaw members radially inwardly of the coupling body against the end portion of the pipe when received in the coupling body; and

means for securing the jaw members to the coupling body.

2. A coupling for attachment to the end portion of a pipe according to Claim 1, wherein the means for securing the jaw members to the coupling body includes linear slots through the coupling body, and bolts extending from the jaw members slidably through the slots.

3. A coupling for attachment to the end portion of a pipe according to Claim 2, wherein the bolts have heads at one end, and wherein at least one of the linear slots has an end portion toward the end of the inner end taper adjacent an end of the coupling body and a bolt head receiving recess in that end portion which receives the bolt head of the bolt extending through that slot to lock the bolt and jaw member from which it extends in position toward the end of the inner end taper adjacent an end of the coupling body.

4. A coupling for attachment to the end portion of a pipe according to Claim 2, wherein the coupling joins two pipes in end to end relationship, each pipe having an end portion, wherein the coupling body is adapted to closely receive the end portion of each of the two pipes to be joined in end to end relationship, the set of jaw members being located toward one end of the coupling body to engage the end portion of one of the two pipes to be joined, the coupling further including

a second coupling body inner end taper adjacent the other end of the coupling body;

a second set of jaw members slidably positioned in the second inner end taper of the coupling body so that linear movement of the jaw members of the second set of jaw members toward the end of the second inner end taper causes movement of the jaw members of the second set of jaw members radially inwardly of the coupling body against the end portion of the other of the two pipes to be joined when the other pipe is received in the coupling body; and

second means for securing the jaw members of the second set of jaw members to the coupling body.

5. A coupling for attachment to the end portion of a pipe according to Claim 4, wherein the bolts have heads at one end, and wherein at least one of the linear slots at each of the inner end taper and second inner end taper has an end portion toward the end of the inner end taper or second inner end taper adjacent an end of the coupling body and a bolt head receiving recess in that end portion which receives the bolt head of the bolt extending through that slot to lock the bolt and jaw member from which it extends in position toward the end of the inner end taper or second inner end taper adjacent an end of the coupling body.

6. A coupling for attachment to the end portion of a pipe according to Claim 4, wherein at least one jaw member of at least one of the set of jaw members and the second set of jaw members includes means for mechanically moving the at least one jaw member linearly outwardly toward the end of the inner end taper and second inner end taper to tighten the jaw members about a pipe received in the coupling.

7. A coupling for attachment to the end portion of a pipe according to Claim 6, wherein the means for mechanically moving the at least one jaw member outwardly includes a tightening bolt.

8. A coupling for attachment to the end portion of a pipe according to Claim 7, wherein at least one jaw member of at least one of the set of jaw members and the second set of jaw members includes means for mechanically moving the at least one jaw member linearly inwardly away from the end of the inner end taper and second inner end taper to loosen the jaw members

about a pipe received in the coupling.

9. A coupling for attachment to the end portion of a pipe according to Claim 8, wherein the means for mechanically moving the at least one jaw member includes a loosening bolt.

10. A coupling for attachment to the end portion of a pipe according to Claim 9, wherein the means for mechanically tightening and for mechanically loosening the at least one jaw member includes a tab extending from the connector body with threaded hole therethrough to selectively threadedly receive the tightening and loosening bolt, and wherein the bolt head of the bolt extending from the at least one jaw member through the slot includes both a hole through which the tightening bolt can extend when the hole is aligned with the hole through the tab and a dead end hole into which an end of the loosening bolt can extend when the dead end hole is aligned with the tab.

11. A coupling for attachment to the end portion of a pipe according to Claim 10, wherein the same bolt can be selectively used as the tightening and loosening bolt depending upon the bolt orientation through the hole in the tab.

12. A coupling for attachment to the end portion of a pipe according to Claim 1, wherein at least one jaw member of the set of jaw members includes means for mechanically moving the at least one jaw member linearly outwardly toward the end of the inner end taper to tighten the jaw members about a pipe received in the coupling.

13. A coupling for attachment to the end portion of a pipe according to Claim 12, wherein the means for mechanically moving the at least one jaw member includes a tightening bolt.

14. A coupling for attachment to the end portion of a pipe according to Claim 13, wherein the tightening bolt is threaded into the jaw member and rotation of the tightening bolt causes the tightening bolt to act against the coupling body to move the jaw member in relation to the coupling body.

15. A coupling for attachment to the end portion of a pipe according to Claim 1, wherein

at least one jaw member of the set of jaw members includes means for mechanically moving the at least one jaw member linearly inwardly away from the end of the inner end taper to loosen the jaw members about a pipe received in the coupling.

16. A coupling for attachment to the end portion of a pipe according to Claim 15, wherein the means for mechanically moving the at least one jaw member includes a loosening bolt.

17. A coupling for attachment to the end portion of a pipe according to Claim 1, wherein the means for securing the jaw members to the coupling body includes linear slots through the coupling body and bolts extending from the jaw members slidably through the slots, wherein at least one jaw member of the set of jaw members includes a tightening bolt for mechanically moving the at least one jaw member linearly outwardly toward the end of the inner end taper and a loosening bolt for mechanically moving the at least one jaw member linearly inwardly away from the end of the inner end taper, wherein the means for mechanically moving the at least one jaw member outwardly and for mechanically moving the at least one jaw member inwardly includes a tab extending from the connector body with threaded hole therethrough to selectively threadedly receive the tightening bolt and the loosening bolt, and wherein the bolt head of the bolt extending from the at least one jaw member through the slot includes both a hole through which the tightening bolt can extend when the hole is aligned with the hole through the tab and a dead end hole into which an end of the loosening bolt can extend when the dead end hole is aligned with the tab.

18. A coupling for attachment to the end portion of a pipe according to Claim 1, wherein the pipe to be received in the coupling has an end groove therein, and the jaw members are adapted to engage the groove in the pipe end when the pipe is received in the coupling body.

19. A coupling for attachment to the end portion of a pipe according to Claim 18, wherein the jaw members are adapted to loosely engage the groove to allow the pipe end to slide with respect to the jaw members upon expansion or contraction of the pipe.

20. A coupling for attachment to the end portion of a pipe according to Claim 1, wherein the pipe to be received in the coupling has a shoulder ring extending therefrom, and the jaw members include a groove adapted to engage the shoulder ring in the pipe end when the pipe is received in the coupling body.

21. A coupling for attachment to the end portion of a pipe according to Claim 20, wherein the jaw members are adapted to loosely engage the flange to allow the pipe end to slide with respect to the jaw members upon expansion or contraction of the pipe.

22. A coupling for attachment to the end portion of a pipe according to Claim 1, wherein the coupling is adapted to join the ends of two pipes and wherein the coupling body includes at least one gasket sealing means for sealing around the ends of the pipes to be joined to prevent leakage therefrom.

23. A coupling for attachment to the end portion of a pipe according to Claim 22, wherein the at least one gasket is an bell type gasket.

24. A coupling for attachment to the end portion of a pipe according to Claim 22, wherein the pipes to be joined form a gap in the coupling body between the pipe ends and the gasket bridges the gap and contacts and seals respective pipe ends in the coupling body.

25. A coupling for attachment to the end portion of a pipe according to Claim 24, additionally including a crib ring cooperative with the gasket seal to spread the seal over the gap.

26. A coupling for attachment to the end portion of a pipe according to Claim 25, wherein the crib ring has an outside perimeter, and additionally including means for pressing the outside perimeter against the pipe ends received in the coupling.

27. A coupling for attachment to the end portion of a pipe according to Claim 24, wherein the gasket extends substantially smoothly over and between the gap to substantially prevent eddying of fluid flowing in the pipes, and includes strips between incisions therein to allow strips to deflect as the pipe ends move in relation to one another during thermal expansion and contraction of the pipes.